

National Digital Mammography Archive

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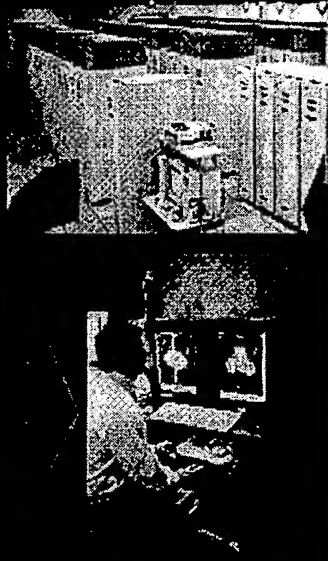
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Benefits

The NDMA will act as a dynamic resource for images, reports, and all other relevant information tied to the health and medical record of the patient. It will be a repository of current and previous year studies and will provide services and applications for both clinical and research use. The development of such a national breast imaging archive will revolutionize the breast cancer screening programs in North America.

Digital Archive Benefits

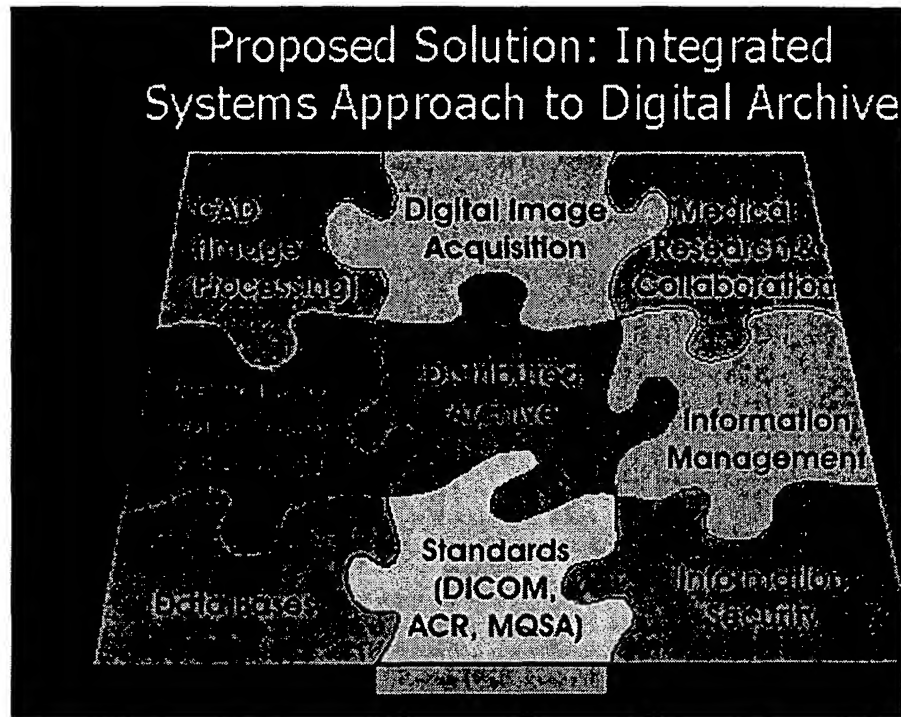
- Improve access/performance of breast cancer screening
- Support storage, retrieval, distribution of digital images
- Aid both clinical and research applications
- Maintain digital record of prior examinations and history
- Permit access to specialists for consults and secondary reads
- Facilitate epidemiological research and data searches



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Integrated Systems Approach

The NDMA is unique in terms of design and development. It will be fully integrated the front end of the portal through the various archive tiers at the time of development.

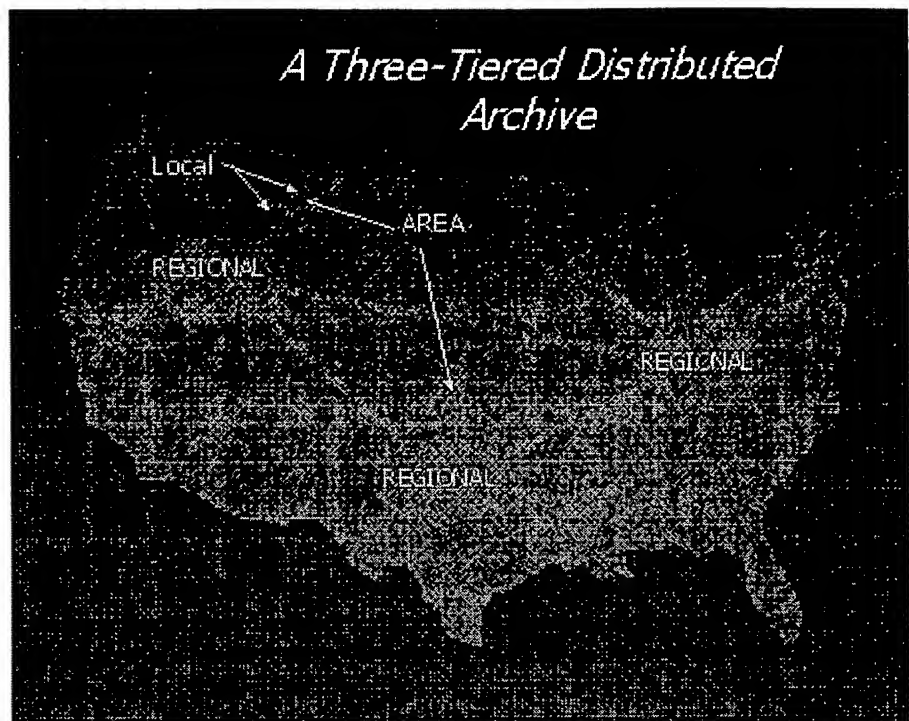


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Distributed Control

We will develop a scalable archive with a distributed architecture to store digital mammograms, other breast images and patient level data. In a system with **distributed control**, no single machine controls the entire system, but a group of machines cooperate to jointly control the system. There are three main reasons for having an archive with distributed rather than centralized control: **scalability**, **fault tolerance**, and **Quality of Service (QoS)**. To be **scalable**, the performance of the system has to be maintained as the amount of storage and the number of requests increase. **Fault tolerance** means that a component of the archive can go down, but the rest of the system and/or a backup server will ensure that there is no noticeable drop in performance. **QoS** metrics in this system are the end-to-end delays, which are composed of propagation, queuing and transmission delays, packet loss probability, and guaranteed bandwidth.

An archive with distributed control, and in particular a hierarchical archive with local, area, and regional levels, is preferable to an archive with centralized control. In the NDMA architecture, the local hospitals are end-nodes or "leaves," area archives serve one or more local hospitals, and regional archives serve the area archives as well as local hospitals as needed. The regional archives are interconnected to form the backbone of the hierarchy. The ultimate goal is to achieve "resource pooling," where the distributed archive emulates one huge archive with a capacity equal to the aggregate capacity of the distributed archive. Access at the local hospitals is transparent with respect to the distributed nature of the system.



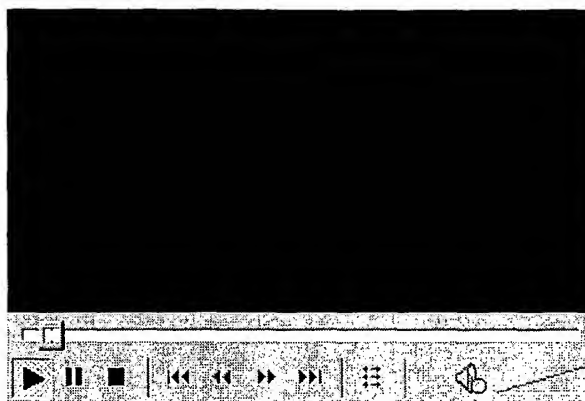
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Components

- Acquisition devices and workstations that send images and data to the archive through a secure portal from the hospital
- Secure portal to identify and authenticate users, control access, create and receive messages, queue traffic, implement Quality of Service
- Virtual Private Network (VPN) to encrypt traffic between secure portals and archive
- Secure Archive (front-door to storage facility)
- Archive storage and retrieval
- Integrated databases
- Audit logs for security and performance; auditing and reporting capabilities for system administrators and security personnel
- Standards for medical image transmission (DICOM); network protocols (TCP/IP), structured reports (BiRads), and many others
- Information management tools

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Automated Tape Robot



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